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W. Evans.

Signed

Dated 8 March 2005



THE PATENT OFFICE

A

18 MAY 2004

NEWPORT

Request for grant of a patent

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Cardiff Road
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1. Your reference

SCSS3

18 MAY 2004

2. Patent application number

(The Patent Office will fill this part in)

0411015.1

18MAY04 E896775-1 B20639

F01/7700 0.00-0411015.1 NONE

3. Full name, address and postcode of the or of each applicant (underline all surnames)

DR KIN FAI KAM
12 BLAKENEY PLACE
YORK YO10 3HZ

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

8794968001

4. Title of the invention

SPECTACLE COMFORT SUPPORT SYSTEMS

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

AS ABOVE

Patents ADP number (if you know it)

6. Priority: Complete this section if you are declaring priority from one or more earlier patent applications, filed in the last 12 months.

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

GB

GB0402289.3

3/2/04

GB0407774.9

6/4/04

7. Divisionals, etc: Complete this section only if this application is a divisional application or resulted from an entitlement dispute (see note d)

Number of earlier UK application

Date of filing
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8. Is a Patents Form 7/77 (Statement of inventorship and of right to grant of a patent) required in support of this request?

Answer YES if:

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

Otherwise answer NO (See note d)

NO

9. Accompanying documents: A patent application must include a description of the invention. Not counting duplicates, please enter the number of pages of each item accompanying this form:

Continuation sheets of this form

Description

Claim(s)

Abstract

Drawing(s)

0

9

6

0

6+6

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for a preliminary examination and search (Patents Form 9/77)

Request for a substantive examination (Patents Form 10/77)

Any other documents (please specify)

11. I/We request the grant of a patent on the basis of this application.

Signature(s)

K. F. Kam

Date 17/5/04

12. Name, daytime telephone number and e-mail address, if any, of person to contact in the United Kingdom

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Spectacle Comfort Support Systems

The invention relates to reducing discomfort for wearers of conventional spectacles and devices that use spectacle-like fitment.

Typically, a conventional spectacle frame rests on the nose, balances on the ears and anchors around the ears. Even if the perfect fitment is attained, prolonged wearing of spectacles leads to discomfort, as there is constant pressure on the nose, and to a lesser extent, pressure around the ears region. Discomfort due to nasal pressure can be particularly acute for wearer with heavy lens prescriptions or wearer of heavy optical devices that rely on spectacle frame type of fitment e.g. heavy goggles, some head-mount display and medical optical devices such as binocular loupe which does not have additional support mechanism. The current common solutions are via the use of non-conventional spectacles with headband or other headwear support, or an unsightly headband support that can be used on conventional spectacles, which alleviate pressure around the ear area. Other solutions also include the use of special nose-guard, cheek-lifts, and even using adhesive tape to reduce pressures from the nasal and/or ear regions. For the average wearer of conventional spectacles, the above solutions are inconvenient, expensive or cosmetically undesirable.

The object of the present invention is spectacle comfort support system which utilises innovative support systems in conjunction with existing common headwear apparels or specially designed headwear. Unlike other related inventions which also utilise a headwear as a kind of weight transfer support (see for example patents GB2337443, US5056164, US4636048, EP1124152, WO9322946, US2004701), the current invention does not require specially adapted spectacle as are apparent from these prior arts: any conventional spectacle as already worn by a spectacle wearer could benefit from this standalone invention which acts on the temple arms of the spectacle. Pressures around the nose and/or ears can be minimised by providing lifting action on the temple arms of the spectacle via the use of a support system, which transfer some or all of the weight of the spectacle to the headwear. Furthermore, sideways pressures from the temple arms of the spectacle can also be reduced or increased via the transfer of sideways pressures on to the supporting system. By using existing common

headwear as part of the current spectacle supporting system, it serves to make the purpose of the current invention cosmetically much more desirable, and considerably more convenient and comfortable to use. In the case of one embodiment of this invention which utilise magnetic elements, the support systems is almost completely inconspicuous, thus improving the product's cosmetic appeal. Using the present invention, wearer of conventional spectacles or other heavy spectacle-fitting device will experience a significant reduction in discomfort as contact pressures due to wearing the spectacle is reduced or entirely removed. Furthermore, the user may also notice an additional beneficial effect of improved stability of the spectacle frame, which may confer some advantages in some sporting activities. The use of the current invention will also reduce or eliminate sores, or production of excess grease or perspirations in the contact skin regions. Spectacle wearer with facial abnormalities or sensitive skin conditions may also benefit from using the present invention.

The generic form of the invention comprises: -

- a) A form of headwear e.g. baseball cap, visor cap, hats, headband, helmet.
- b) One or more support rod, or string. The rod or string may be of fixed or of adjustable length. The upper part of the rod or string is attached to a), preferably to part of a) which protrudes beyond the circumference of the head e.g. the brim of a hat or cap. The attachment may be fitted permanently or detachably to a). The lower end of each rod or string has detachable means to attach to the temple arm of a spectacle.
- c) Means of securing the upper part of b) to a), with potential to adjust the vertical and/or lateral positions of the supporting rods or strings
- d) Detachable means of attaching the temple arms of the spectacle with the lower end of b). For example, in the case of using a support rod, the lower end of the rod could be of a hook-shaped design which can be used to support the temple arm of the spectacles. In the case of a supporting string, a powerful mini magnet may be attached to its lower end, which can then act to lift the temple arm of the spectacle if it has magnetically attractive elements within it e.g. containing ferromagnetic materials in the temple arms of the spectacle frame. If the temple arms of the spectacle do not already have magnetically attractive material within it, then it is possible to put an attachment containing magnetically attractive materials through each temple arm. When the upper

part of b) is adjusted and securely attached to a) as described in c) above, the invention will thus alleviate nasal and/or ear pressures by transferring the weight of the spectacle to the headwear. Note, lateral pressures due to the temple arms on the temple of the head may also be reduced or increased, since depending on the lateral orientation of the supporting rods or strings, they may also provide horizontal (lateral) as well as vertical tension within the supporting rod or string systems. Note lateral compression pressure is possible only with the solid supporting rods system.

- e) There can be variations in the invention. For example, as an alternative supporting mechanism to d), the invention can be used by means of supporting the nose bridge of the spectacle using the lower end of b). Also, transferable versions of the spectacle comfort support systems are also proposed below, which allows it to be used on different headwears. Furthermore, it is also proposed that spectacles may be designed specially to include magnetically attractive elements built within its frame (e.g. in part of the temple arms or nose bridge of the frame), such that it can be used with the magnetic supporting mechanism described in d) above, without the use of magnetic attractive attachments.

The invention and several variants will now be described solely by way of example and with reference to the accompanying drawings in which:

FIGURE 1 shows a spectacle user wearing a headwear, with two length adjustable support rods, acting to reduce nasal pressure.

FIGURE 2 shows a cap with a headwear-support rod attachment system, which allows height and lateral adjustments of the support rod.

FIGURE 3 shows a cap-support rod attachment system using a spring-loaded stopper.

FIGURE 4 as Figure 1, except the support rod are replaced by a string-magnet support system and the spectacle wearer is not shown.

FIGURE 5 shows a transferable version of the spectacle comfort support system, and its application demonstrated on a cap.

FIGURE 6 shows a different application of the spectacle support system, with the support rod acting on the nose bridge of the spectacle.

FIGURE 7 shows a tilted front-on view of a well designed spectacle comfort support system headwear, incorporating several design features mentioned in this application.

FIGURE 8 as Figure 7, but showing the underside view, with the support rods folded in the non-use position.

Figure 1 shows a spectacle wearer using an example of the present invention which comprises a headwear with a brim 1, with two length adjustable support rods 2, each attached independently to the brim of the cap with some flexibility to rotate about the vertical axis direction as indicated by the arrow 3. This flexibility may be provided by a resistive rotating hinge mechanism or simply provided by the flexibility of the brim. The headwear-rod attachment method may be permanent or detachable (e.g. by means of using clips, hinges, pins, stoppers, snap-on/off buttons, Velcro or some other standard methods of rod-headwear attachment. A novel method is described in figure 2 below) The lower end of the rod is shaped in a partial hook-shaped form 4, so as to enable each temple arm 5 of the spectacle, to rest stably on each rod, thus reducing nasal pressure once the length of each rod is adjusted accordingly. The use of a lightly bent hook shape design rather than a fuller hook design is so that it only lightly secures the temple arm of the spectacle, thus allowing quick and easy engagement or disengagement of the support rods 2 with the spectacle. In fact, for most non-physically active situation, a simple L-shape tip design is sufficient, whereas in some other situations, a more secure attachment may be preferred e.g. a sideways U-shape tip for the temple arm to rest in. The tip should be covered by a soft resilient material (e.g. soft transparent latex or rubber) for superior grip and safety. The positions of the attachments as shown are such that nasal pressure is most effectively minimised or eliminated totally, as most of the spectacle weight are resting on the tips of the rod. It is also possible to reduce the pressures around the ear, if the attachment is situated

nearer to the ear, such that the support rod can support the temple arm nearer to the ear.

In general, the support rod can be made of any solid materials as desired. The lower end of the support rod may also be malleable to further enhance fitment with different temple arm types of different spectacle frames. The length adjustment feature of the support rod can be achieved via the usual means such as a two-piece telescopic arrangement. However, my preferred arrangement is a support rod with a resistive stretchable and/or bendable section that allows the support rod to be readily stretched or compressed and/or bent to the desired length and orientation respectively, and allows it to remain stably in that position even when it is supporting the weight or against the lateral pressure exerted by the temple arm of the spectacle. A rather less stable example of this type of section can be observed in the common plastic drinking straws with a bendable and stretchable 'concertina' section.

This paragraph describes some additional design features not shown in Figure 1. For cosmetic and design appeals, the support rod may be clear or transparent, or in any colour that one prefers. When the supporting rod is not being used, it may also be hidden away by adjusting it to lie on the underside of the brim of the hat. The adjustment mechanism can be achieved via many methods: the 'concertina' type section of the support rod may be situated immediately below the brim, so that the support rods can be simply adjusted to lie under the brim as required. Alternatively, the attachment of the support rods with the brim may be via the use of resistive hinges or swivel attachments which allows it to freely fold underneath the brim of the hat. For perfect fitment with the shape of the brim when the support rods are folded, the latter may be designed to shape conformally to the curve of the brim.

Figure 2 shows a novel example of how a support rod 2 of fixed or adjustable length can be attached to the headwear. The brim 1 of the headwear has embedded within it, a circularly shaped rubber inserts 6 with thorough cuts made within it (hereafter this insert will be referred to as a compressed holder). The support rod is then simply inserted through the cuts and its position remains fixed within it due to the compression of the rubber or similar materials that offer natural compression tension. In figure 2, the cuts made in the compressed holder 6, are made in the shape of a

cross. The compressed holder design allows free vertical adjustment of the support rod, as well as limited lateral adjustments depending on the desired size and shape of the compressed holder and its cuts. If desired, a stopper may also be inserted through the upper part of the rod, on the upper side of the brim to completely secure the support rod from slipping downward. An example of a stopper being used is shown in figure 3.

Figure 3 shows a spring-loaded stopper (7A, 7B) is used to adjust and fix the support rod to the brim 1 of the headwear. For clarity, only one-rod support system is shown. The stopper is securely attached to the brim 1, with the support rod 2 passing through the case of the stopper 7A and so that the vertical position of the support rod can vary easily by depressing the spring-loaded button part 7B of the stopper. The stopper may be used in conjunction with the compressed holder as discussed earlier for maximum stability, or use on its own as shown in figure 3, which allows for vertical adjustment only. Note the hole or gap made in the brim of the headwear is normally assumed to be sufficiently flexible or large enough to allow some free movement of the support rod 2 relative to the vertical axis 3.

In general, the descriptions given for figures 1 to 3 above are also applicable, if the solid support rod is replaced by a supporting string system, consisting of a string 8 and a magnetic tip 9, as shown in figure 4. The lower end of the string is attached a small powerful magnet e.g. a disc neodymium based magnet. The use of this type of powerful magnet means that the magnet can be quite small for the purpose of lifting the weight of a spectacle. The string may be made of very thin but strong material, like nylon, so that beside the standard headwear, the support system is almost completely inconspicuous. The other advantage of using magnets as an attachment method to the spectacle frame is the ease of engaging or disengaging of the support system with the spectacle. In order for the string to act as a supporting system to the spectacle frame, it is necessary for the spectacle to contain magnetically attractive elements in the appropriate positions. This can be achieved in several ways: a) the spectacle may already have magnetic materials within its frame structure e.g. steel screws used in the hinges of the temple arms, or the temple arms structure may consist of ferromagnetic materials b) a specially designed spectacle frame which has magnetically attractive elements strategically located in the frame to work with the

magnetic support system. This may be especially relevant for spectacle wearer with facial abnormalities where more than two support rods or stings are used to alleviate pressures from both the nasal and ear regions and c) using an additional magnetic attractive attachment that can be freely positioned to the temple arms 5 of the spectacle. A simple example is shown here in figure 4, which consists of a detachable attachment 10, which has, some magnetic attractive elements (e.g. this could be in the form of an elasticised sleeve containing ferromagnetic materials such as iron or steel) embedded within it. The advantage of this option is that it can be used on any spectacle. Note the attachments 10 may also display the brand's name and/or logos as part of a fashion design feature. The double arrows 11 indicate the attractive forces between the magnetic elements 9 and 10. Note in general, the magnetic elements 9 and 10 are for the purpose of mutual attractions; hence they can of course be interchanged as desired, depending on the design preference.

A useful feature that is not shown in Figure 4, would be a magnet resting site, located on the underside of the hat's brim, within a distance reach of each of the supporting string. The magnetic resting site could simply be a site containing some magnetic attractive elements, so that when the strings 8 and magnets 9 are not in use, they can then simply be put away by attaching the magnets 9 on to the magnetic resting sites:

The use of magnetic support method can also apply to the solid support rod system of figures 1 to 3. In this case, the lower part of the support rod is made magnetic, which would then provide a magnetic attraction and support to the temple arms 5 that have been made magnetically attractive e.g. by using magnetically attractive sleeve 10 as described above. Note the magnetic attractive system means the support rods do not need to use an L- or hook shaped tip as a supporting rest, thus allowing even more efficient and fine adjustments of the spectacle position relative to the hat.

Figure 5 shows a transferable version of the spectacle support system that is not specific to a headwear that has been adopted to accept the support rod or string supporting system. Instead, a clip-on device is incorporated to the upper part of the support rod or string system as described earlier. The clip-on device essentially consists of a clip 12 with a built-in rod (or string) length adjustment system. Figure 5 shows a string-magnet support system with a spring loaded stopper 7A, 7B as the

length adjustment system. The clip-on device therefore can be attached to any unmodified headwear where it can find an appropriate location for attachment i.e. onto the brim of a hat or cap. Note in Figures 4 and 5, a spring loaded stopper 7A, 7B was shown as the length adjustment system. It should be aware that other string length adjustment system, such as a mini-wheel spool with lockable rotation mechanism can be used instead.

Figure 6 shows a different application method of the present invention, whereby the supporting system is placed centrally in the brim of the headwear, such that now the support system acts on the nose bridge 13 of the spectacle. Also, a variation of the hook-shape tip is shown, whereby it now consists of two malleable hook-shaped ends 14, which brings extra adjustability to the design, by allowing the spectacle frame to rest stably at the correct angle relative to the wearer's eyes.

Figure 7 shows a visor cap, with support rods 2 that has a magnetic piece 15 located at each end of the support rod. Thus hook shaped support end is not needed, provided the spectacle contains magnetically attractive materials as described in Figure 4. The top part of the support rod is attached to a flexible and stretchable section 16 which allows limited resistive semi-permanent length adjustments and bending movements (e.g. a concertina section as described earlier), such that the normal optimal resting position of the spectacle can be quickly adjusted for. Once the optimal resting position is found, the flexible section should remain stable, unless a significant greater force than the weight of the spectacle is applied. When the supporting rods are not in used, it can be folded (via bending the flexible section 16) to lie neatly on the underneath side of the brim 1 as shown in Figure 8. To prevent the support rod from dropping downward when not in used, there is a resting site 17 for each support rod, which contains magnetically attractive metal attached to the underside of the brim. If non-magnetic system is employed, then the resting site may consists of a soft loop or hook to secure the support rod. Note that the support rods shown in Figures 7 and 8 have the optional feature of being slightly curved, so that it conforms to the brim's shape when the supports rods are not in use and hidden underneath the brim.

In the description so far, the headwear as shown has a protrusion (i.e. the brim of the hat), which is ideal for attaching the support rod or string for the purpose of this invention. For headwear that does not have any appropriate protrusion, it is quite simple to modify the above description by adding a protruding object in the attachment systems described above. The protruding object could then be attached to the headwear by the usual available means e.g. clips, pins, Velcro, sewing etc. Furthermore, although one of the strength of the present invention is its adoptability with current existing headwear, it is also feasible to design bespoke headwear with the specific purpose of adopting it with the spectacle supporting systems described above. Such bespoke headwear may be made especially comfortable by using hypoallergenic materials at the contact areas, as well as making it especially light, breathable and/or cool to the head (e.g. just having a minimum frame structure that does not cover the entire head, like the visor cap shown in Figure 7). Also the headwear can be adopted to give a wider support over both the nasal and ear regions e.g. a hat with a brim extending over the ear regions, and if necessary built to adopt more than one support rod or string for each side of the temple arm of the spectacle.

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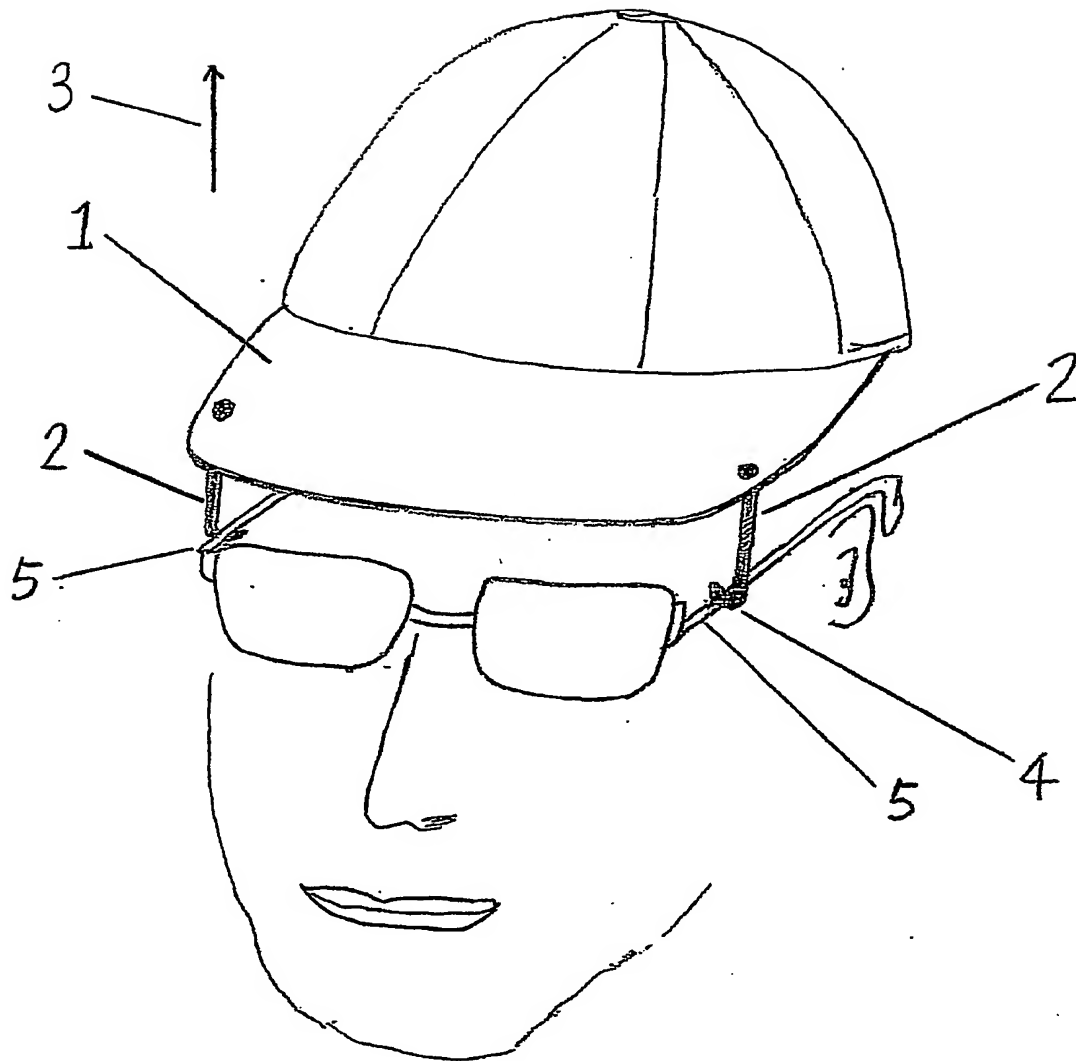


FIG. 1

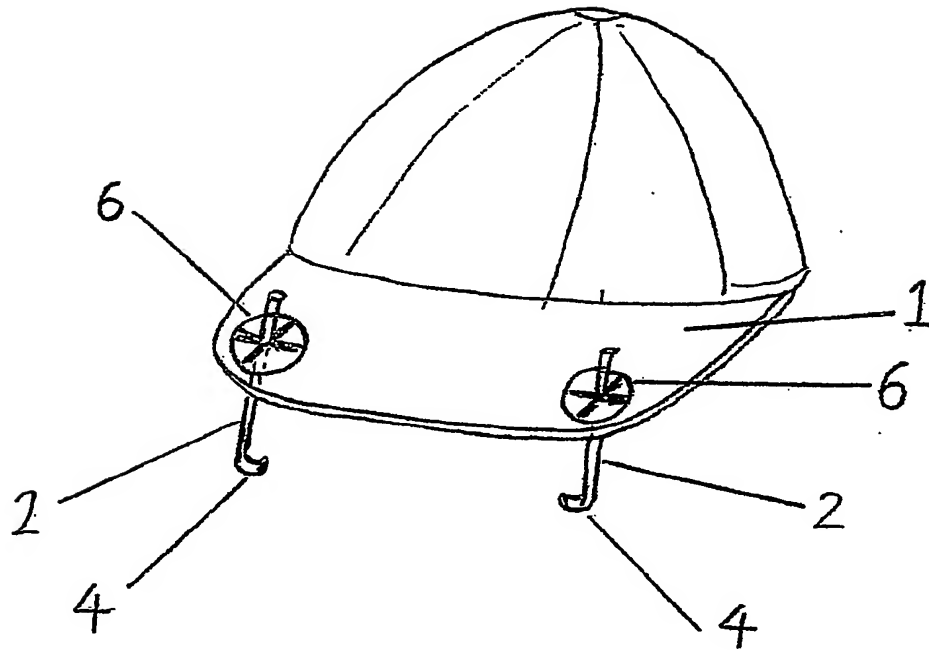


FIG. 2

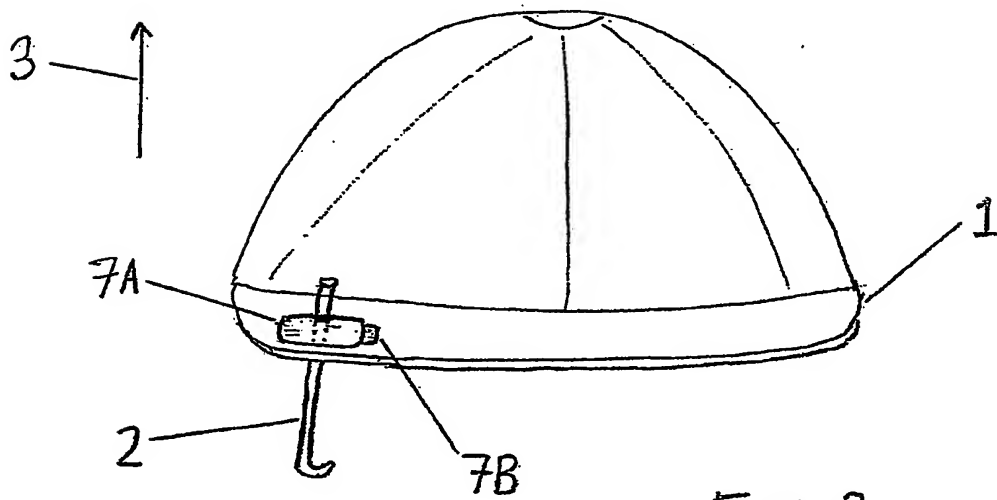


FIG. 3

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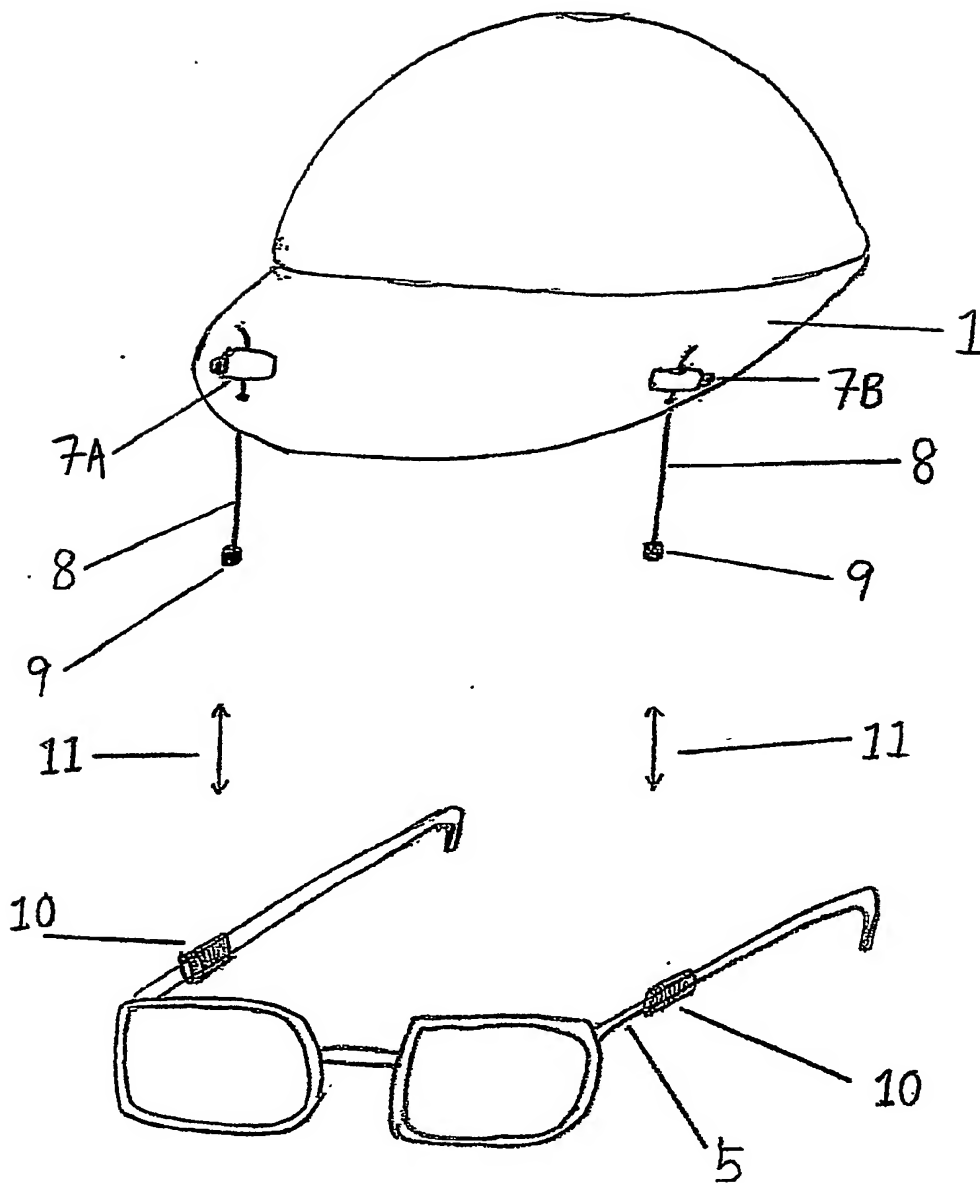


FIG.4

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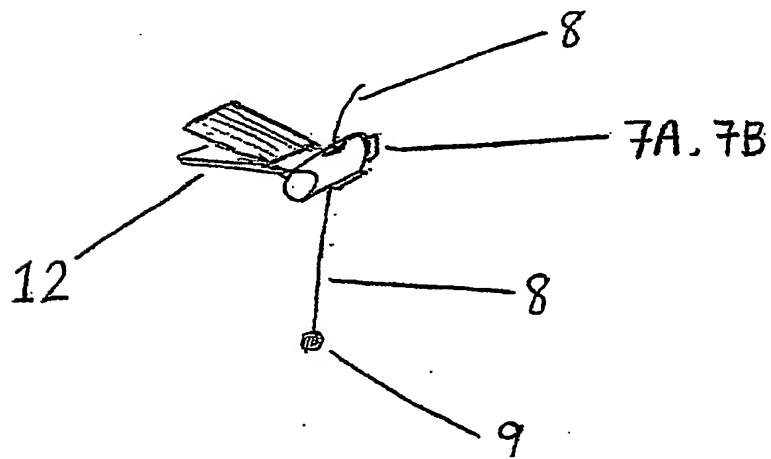
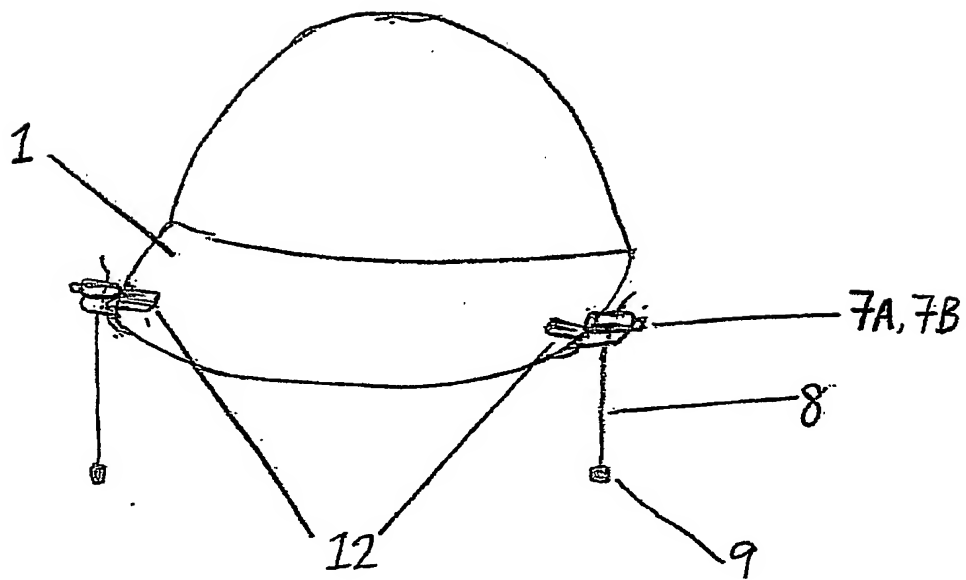


FIG. 5

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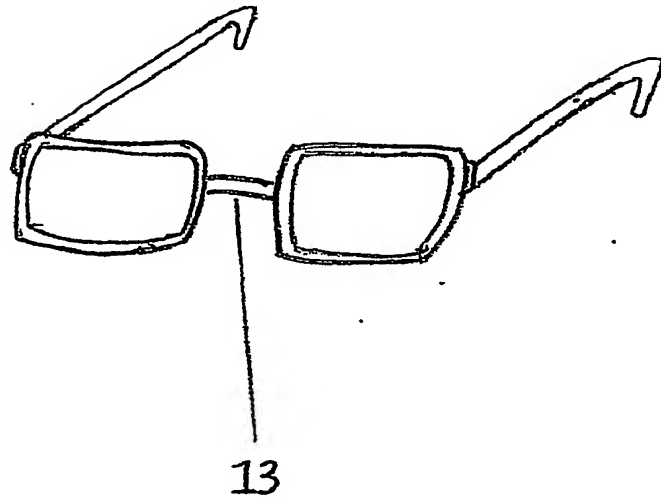
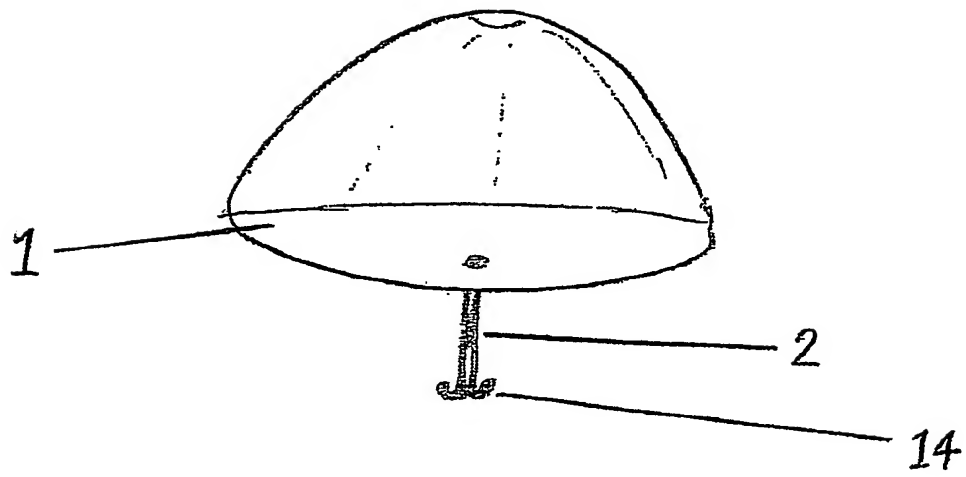


FIG. 6

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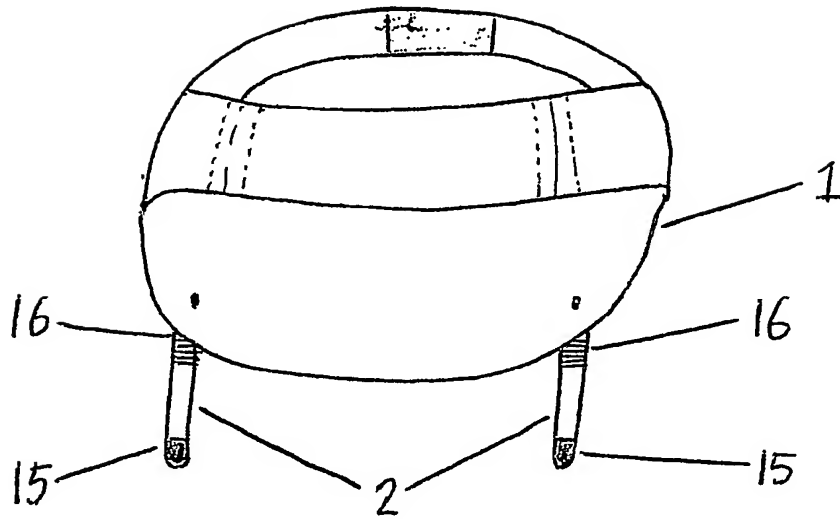


FIG. 7

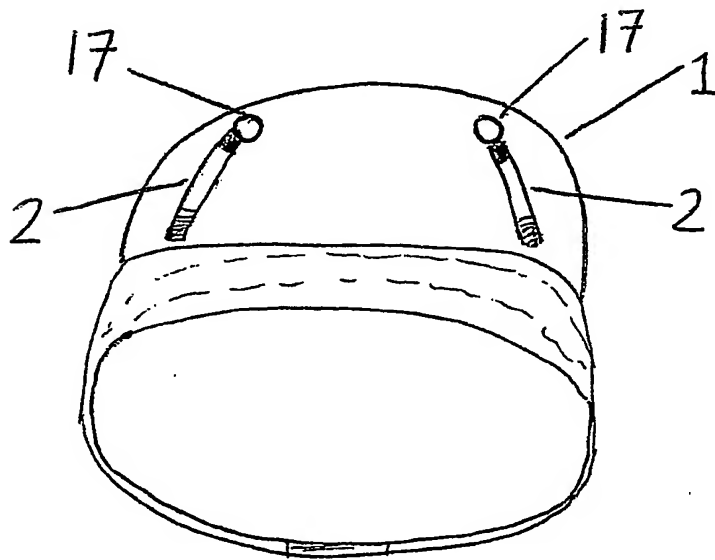


FIG. 8